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AUTHOR Schaefer, G.; And Others
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ABSTRACT

This three-chapter document (part of a series on biology and human welfare) focuses on the teaching of health concepts in biology courses. Health education (as used in this document) is aimed at achieving a state of health consisting of these five elements: body health; mental health; environmental health; social health; and transcendental health. Chapter 1 discusses concepts of health, examining ways to determine students' conceptions of health. Two sample instruments are included. Chapter 2 is a curriculum guide for teaching about health in biology courses. It includes a model for teaching health education through biology, a list of behavioral objectives, and charts (one for elementary and another for secondary school) showing how to fit the teaching of health topics into biology syllabi. These charts list biological topics with suggested health topics, suggested activities, and skills fostered. Chapter 3 offers various general and specific instructional strategies, including criteria for selecting which teaching methods to use and discussions of teaching for social relevance and with a focus on values. An annotated bibliography of references and resources is included. (JN)

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P. J. Kelly

Addresses of Contributors

Mr. J. T. Auman, Faculty of Education, University of British Columbia, 2075 Westbrook Mall, Vancouver, B.C., Canada.

Dr. E. Baydoun, Yarmouk University, Irbid, Jordan.

Professor D. F. Hernandez, Science Education Centre, University of the Philippines, Diliman, Quezon City, Philippines.

Professor K. Inahori, Fukui Prefectural College, 97 Ohata-cho, Fukui 910, Japan.

Dr. W. K. King, School of Education, University of the West Indies, P.O. Box 64, Bridgetown, Barbados.

Mr. E. B. Rugumayo, P.O. Box 53063, Nairobi, Kenya.

Professor G. Schaefer, Faculty of Education, University of Hamburg, Von-Melle-Park 8, 2000 Hamburg 13, F. R. Germany.

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Introduction

The World Health Organisation has set itself the aim of establishing 'Health for all in the year 2000'. It defines health as "complete physical, mental and social well-being, not merely the absence of disease". Other definitions of health refer to environmental health - a balanced existence between people and the natural and man-made physical environments in which they live; and to what may be termed health based on transcendence, referring to the role of religious and metaphysical experience in maintaining the health of a person.

Whilst, clearly, biology teachers cannot deal with all aspects of health seen in these ways nor, by themselves, can they achieve health for all in the year 2000, there is a role they can play. It is the purpose of this book to suggest what this may be. This new role will involve biology teachers in developing an understanding of the perceptions of health prevalent in the societies in which they work and in the minds of their students, rearranging their curriculum and adopting different teaching methods.

The framework for this reorientation should, we suggest, be the idea that health education is aimed at achieving a state of health consisting of five elements:

body health,
mental health,
environmental health,
social health,
transcendental health.

Each of these elements integrates with the others. Health is thus a holistic phenomenon.

Through their training biology teachers will have some understanding of the human body and of environmental aspects of health which can provide a foundation for dealing with health topics. However, health education is a much broader field than this and biology teachers embarking on health education will need to be prepared to learn something about psychology, sociology and anthropology, for example, in order to put their subject into a more relevant perspective. Also they will need to liaise closely with teachers of social studies and other subjects in order that an integrated programme of health education can be developed within the whole school curriculum.

If, as we suggest, a further aim of health education should be to establish a positive view of health by advocating that a healthy person should be active, creative and productive, and capable of adjusting to disorder (not merely free of disease), then it follows also that a teacher should be concerned as much with the development of attitudes towards health as with disseminating knowledge about health.

Chapter 1

Concepts of Health

For effective teaching it is important to know what previous understanding students have of a subject. Do they already understand key ideas on which new knowledge can be built? Have they beliefs or misunderstandings which will hinder the development of appropriate knowledge and attitudes? If answers to such questions are known, relevant teaching programmes can be devised. If not, confusion and frustration can easily result. Fortunately, there has been research which can help teachers in this task (see, for example, Archenhold et al, 1979; Novak et al, 1983).

Schaefer (1979) has introduced the idea of a concept having three aspects; its name, its meaning and its associative framework. For example, the concept energy has its name - energy; a scientific meaning - the power to do work; and in a person's mind it can be associated with a range of other concepts and beliefs such as sport, machines and 'the opposite of laziness'. This model of a concept is valuable because it helps us to understand the relation between what people know and what they do. While a person may understand the meaning of a concept, the way it is translated into behaviour frequently will depend on the concept's associative framework.

As has been said previously, in health education we are concerned not just with passing on knowledge about health but, as importantly, with ensuring that the knowledge is translated into healthy attitudes and behaviour. For this reason it is necessary to find out about the associative frameworks of concepts concerned with health.

One way of determining an associative framework is by using a Free Association Test (Schaefer, 1979, 1980). This is a simple procedure. You ask people to write down, or tell you, what comes first into their mind when you mention the name of a concept. Figures 1 - 8 illustrate the results of free association tests using the concept 'health'. The relative size of each segment indicates the proportion of people responding in a particular way.

This research was carried out in a number of countries by a team established by the IUBS Commission for Biological Education co-ordinated by Professor G. Schaefer. The samples studied were relatively small and thus cannot be seen as necessarily typical of the countries from which they were obtained. However, it is significant that different patterns of association ar shown by the different samples. Thus, in the samples from F. R. Germany, the concept of health is associated strongly with disease, therapy and prevention whilst in the other countries, particularly in the Philippines, there is a greater emphasis on positive health seen as a normal biological function and including even emotional aspects such as happiness. Further scrutiny will reveal other, but smaller, differences between the samples.

An interesting contrast is found in other studies conducted in F. R. Germany. There the subjects were also tested for their associations with the concepts of disease and vigour (Lebenshraft), to which figures 9 and 10 refer. The responses to the concept of disease were not very different from those to that of health. It is with the concept of vigour that associations similar to those found in the Philippines for the concept of health were detected. Such a finding suggests that in order to develop a sound, positive health education programme with students such as those in the F. R. Germany sample, it would be wise to develop associations between the concepts of vigour and health.

Another useful finding from all the samples is the lack of reference to the physical and social environments in the associations. It suggests that health is conceived as a phenomenon of individuals rather than as a holistic relation between individuals and their environments. In teaching one would have to stress the latter.

Another approach to determining the associative framework of a concept is to use a Bound Association Test. With this students are given a diagram such as that in figure 11 and they are asked to refer to the key word in the centre, i.e. Health, and then to write down spontaneously any association coming into their mind relating the concept to the various aspects displayed around the outside of the diagram. It is not necessary for them to respond to every aspect. In figure 11 the percentage responses from samples in four countries are given in the 'boxes' by each aspect. They show that more associations are recalled by respondents when different aspects are drawn to their attention. This suggests that below the surface of the concept of health determined by the free association test are deeper associative structures with different patterns. These patterns again vary between samples but in all of them they cover more of the different states of health. This suggests that if teaching can be related to these bound association patterns, it should be possible to develop the positive and holistic concept of health depicted as the aim of health education in the Introduction.

A third approach to elucidating the nature of the concepts held by students is to use a test of the type shown in figure 12. The responses obtained in samples from six countries are shown in figure 13. Such a test helps to determine what respondents understand about a concept rather than what they associate it with. The results of these particular studies reveal a number of interesting points.

Thus, with all the samples health is understood as the absence of disease by about half of the respondents. There is again an emphasis on the individual and a static conception of health. Interestingly, there is evidence of a broader biological understanding of health in that most respondents see it applicable to organisms other than man. There are also variations between samples; for example, on the value attributed to health. Those of Barbados, Jordan and the Philippines put a higher value on health than the others.

The three studies which have been outlined provide useful information on which health education strategies can be based. However, the main point in referring to them here is to illustrate their value to teachers. By using the different tests (or similar ones) with their classes, teachers can determine what their students understand and what associations may foster or inhibit learning and thus plan the tactics of their teaching accordingly. In addition, the tests can be used as teaching tools. By discussing the results obtained from them either with a class as a whole or with individual students, it is possible to make students aware of the complexities and confusions in their thoughts and to direct attention to other aspects of concepts of which they were previously unaware or did not appreciate. In short, it helps students to think about their thinking. This is a valuable aid to the development of the kind of understanding and attitudes so essential in health education. The use of the tests also illustrate how important it is for teachers themselves to be researchers.

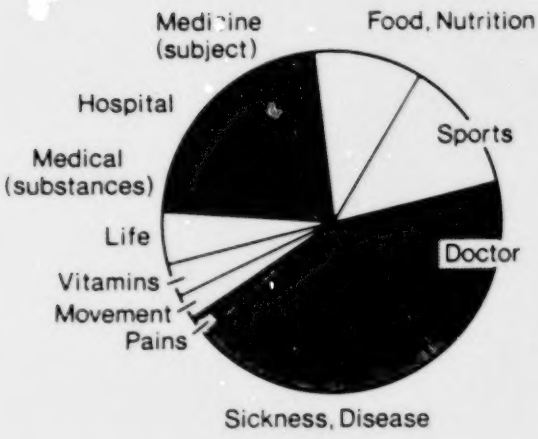

Fig. 1: 11 key-associations to HEALTH in a representative West-German population, 14 to 25 years old, with biological training. n = 588. Hatched areas: disease-oriented associations

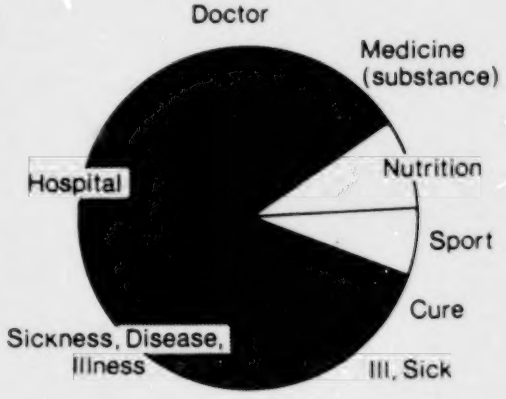

Fig. 2: 8 key-associations to HEALTH in a young population, 13 years old, of a West-German city (West Berlin). n = 62

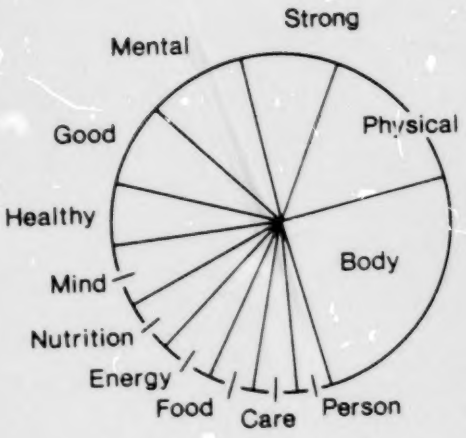

Fig. 3: 12 key-associations to HEALTH in a mixed semi-urban Philippine population, 14 to 16 years old. n = 124

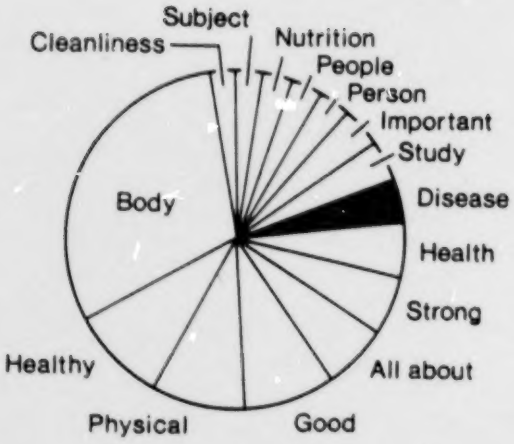

Fig. 4: 15 key-associations to HEALTH in a young semi-urban/urban Philippine population, 12/13 years old. n = 144

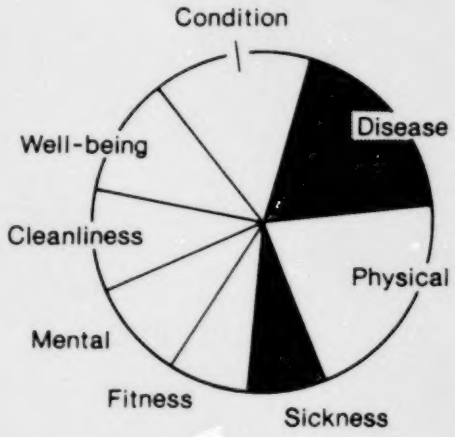

Fig. 5: 8 key-associations to HEALTH in a mixed population of Barbados, West Indies, 14 to 17 years old. n = 51

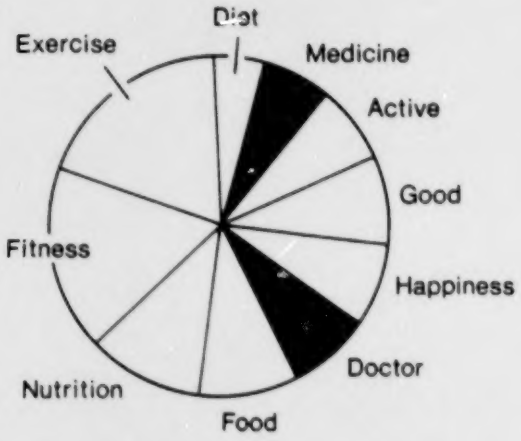

Fig. 6: 10 key-associations to HEALTH in a mixed population of Canada, 15 to 37 years old. n = 87

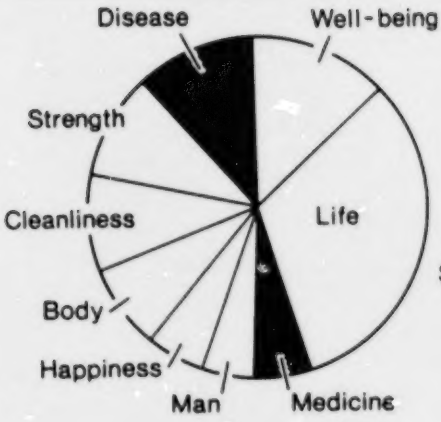

Fig. 7: 9 key-associations to HEALTH in a mixed population of Jordan, 14/15 years old. n = 92

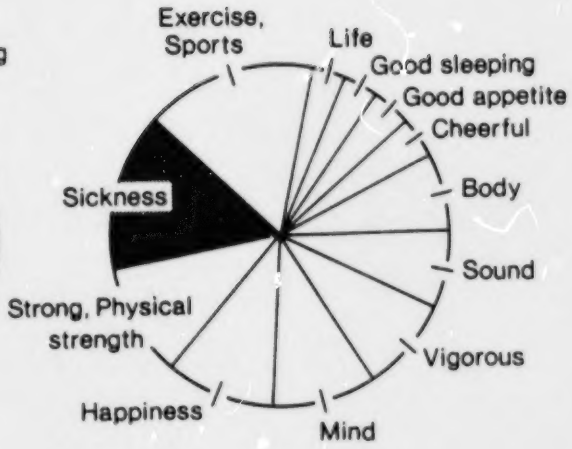

Fig. 8: 12 key-associations to HEALTH in a mixed population of Japan, 18/19 years old. n = 312

Fig. 9: 13 key-associations to DISEASE in a mixed West-German population, 13 to 25 years old, n = 129.

Fig. 10: 12 key-associations to VIGOUR ("Lebenskraft"). Same population as in fig. 9.

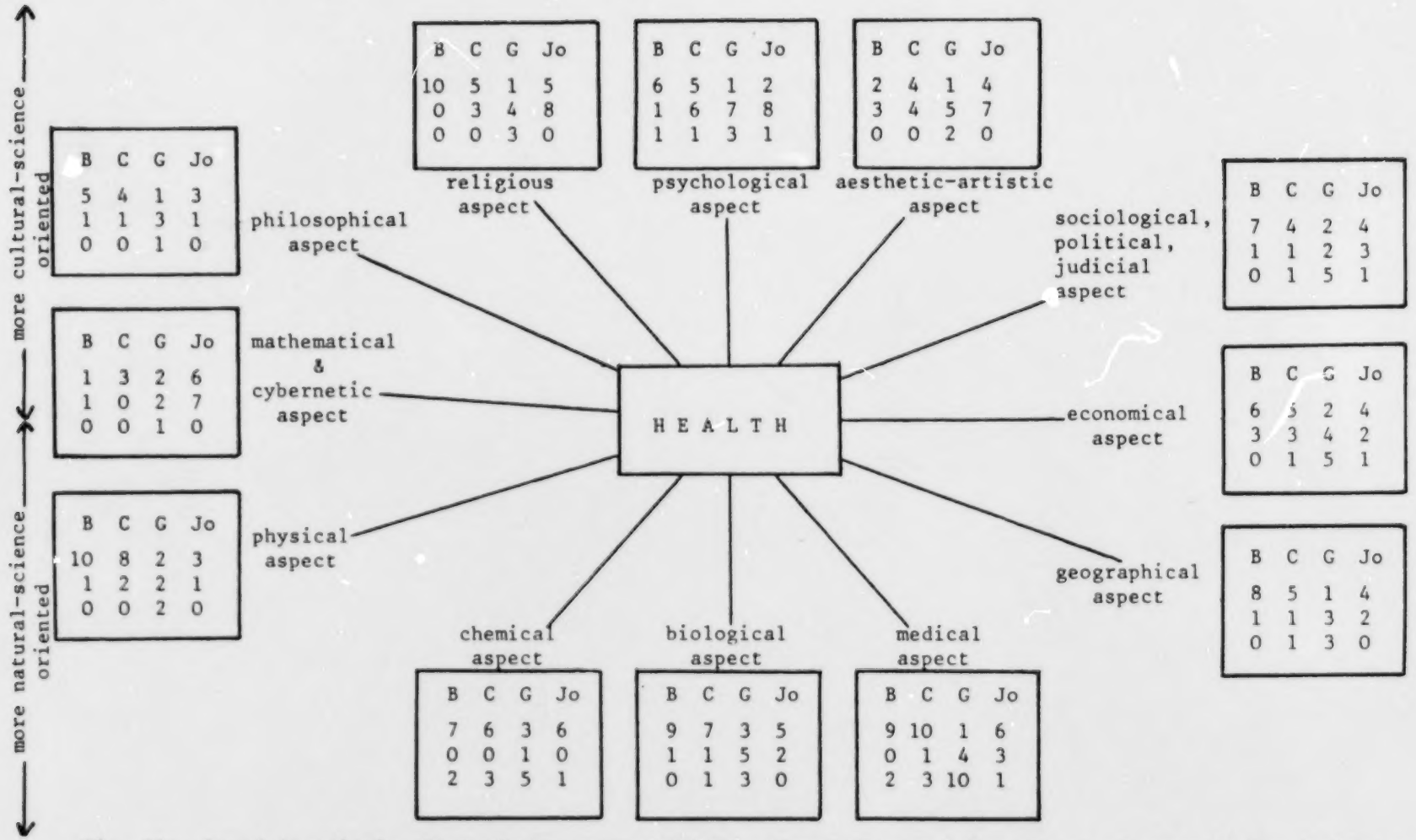

Fig. 11: Bound Association Test of the concept HEALTH. Upper figures: Percentage of neutral associations; middle figures: percentage of positive, health-oriented associations; lower figures: percentage of negative, disease-oriented associations.

B = Barbados C = Canada G = F. R. Germany Jo = Jordan

First read through the statements listed below. Then, place a tick in each box against a statement which you consider to be correct. Several answers may be correct. If you wish to give additional information or make comments, please do so on the back of this sheet.

Concept: H e a l t h

☐ 1. Health is the absence of disease.

☐ 2. Health is the ability of a living system to avoid or repair diseases.

☐ 3. Health is the state of complete physical, psychological, and social well-being.

☐ 4. Health is the permanent process of stabilisation in a living system, i.e. overcoming disturbances.

☐ 5. The concept of health, in the strict sense of the word, is only applicable to Man.

☐ 6. The concept of health is applicable to all organisms (including plants).

☐ 7. The concept of health is applicable to whole populations (groups of organisms as well as single organisms).

☐ 8. The concept of health is applicable also to whole ecosystems and landscapes.

☐ 9. The concept of health is applicable also to non-living systems, e.g. machines.

☐ 10. Health is a matter of an organism being well integrated with its environment.

☐ 11. Health is a necessary pre-condition of life.

Referred to human health only:

☐ 12. Health is the highest value of life.

☐ 13. Health means the freedom to live independently.

☐ 14. Health requires sacrifice and responsible behaviour.

☐ 15. Health only proceeds from a healthy spirit.

☐ 16. Health manifests itself in the ability of a human being to be happy in spite of physical or emotional handicaps.

☐ 17. Health can be attained and maintained principally by physical-material means, e.g. by nutrients and medicine.

☐ 18. Health can be attained and maintained partly by processes in our mind, e.g. will power, meditation, happiness.

☐ 19. Health, in the long run, can only be attained and maintained through processes in our mind.

☐ 20. No answer valid.

Fig. 12: Test of understanding for the concept of HEALTH.

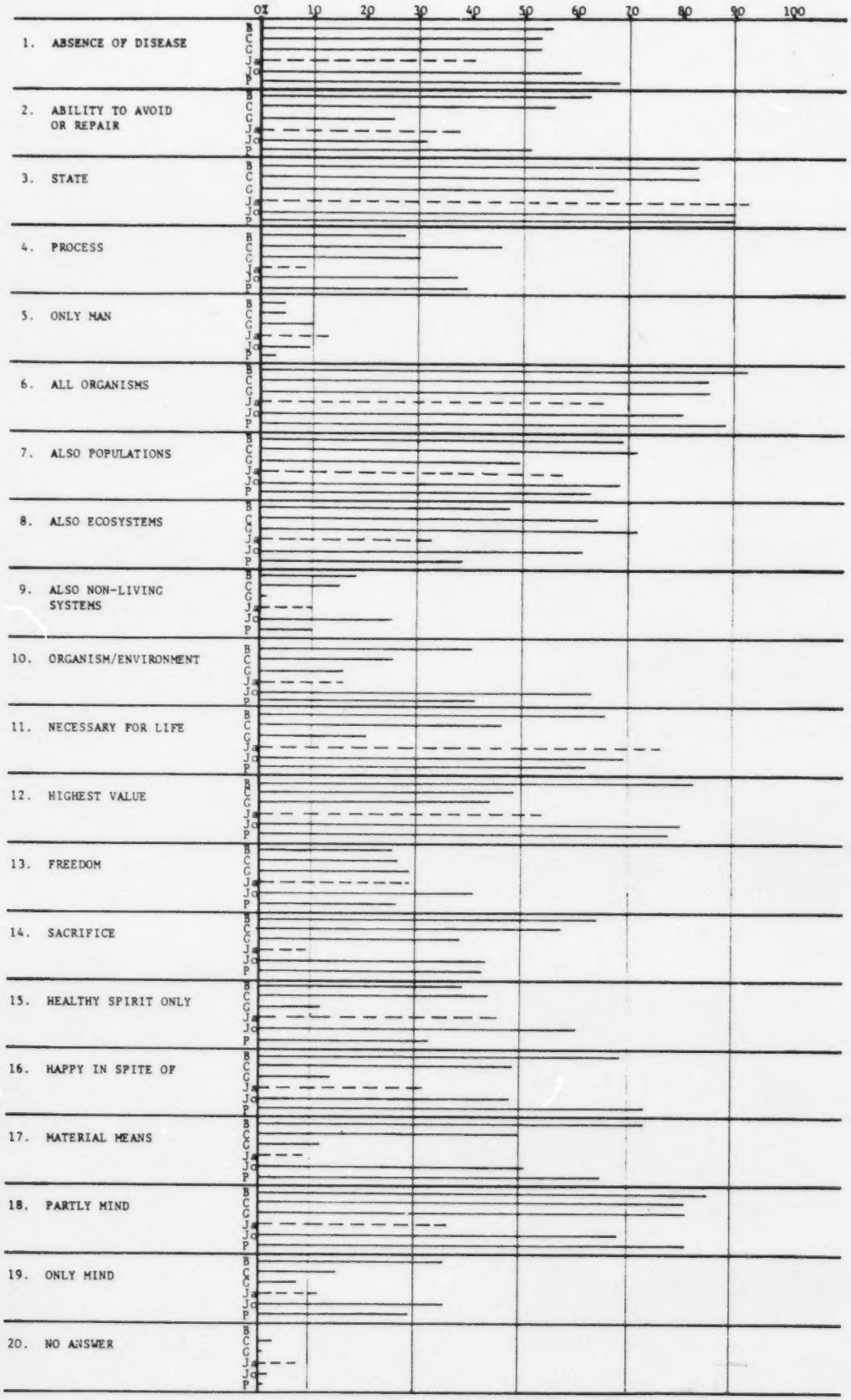

Fig. 13: Percentage responses to each item of the test of understanding of the Concept of Health. Samples of countries are indicated thus: B=Barbados, C=Canada, G=F.R. Germany, Ja=Japan, Jo=Jordan, P=Philippines

Chapter 2

A Curriculum Guide to Teaching about Health in Biology Courses

Health education is derived from a number of sources of which biology teaching is one. For this reason it is important to bear in mind the following points when planning programmes of health education in relation to the biology curriculum:

Health education through biology education cannot be a substitute for public health training of professions and adults in the community.

Health education in school is part of a larger educational programme aimed at delivering health care and services to the population as a whole. Therefore, it is important that teachers are aware of community health programmes and services so that duplication is avoided and coordination is enhanced.

In planning a programme of school health education it is important to ensure that the school itself is a safe and healthy environment for young people and that health services are available to students, to the extent that the school/school system is able to afford them.

Health education may be included in several subjects besides biology, for example, physical education, home economics or domestic science, general science and elementary science. Rarely is health education taught as a separate subject. This situation implies that to have an effective health education programme there must be coordination among all teachers who incorporate health education in their courses.

Selection of content relating to the universal concepts of health must be oriented to local conditions in the student's immediate environment, his community and his country.

There should be balance and harmony between health topics and biological concepts. The basic concepts of biology should not be lost. It is suggested that in a biology or science curriculum that is health oriented there should be greater coverage of basic health principles at the elementary level, whilst biology as a discipline should have greater prominence at the secondary level of education.

A Model for Teaching Health Education through Biology

Figure 14 depicts a possible overall scheme for relating biology teaching to health education. It is based on two central ideas:

(a) that there should be a core of teaching based on principles drawn from elementary biology and/or integrated science courses which develop into a curriculum consisting of topics such as nutrition, disease and immunization, environmental health and first aid. From this, in turn, are established the essential principles of preventive medicine and primary health care;

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(b) that as this curriculum unfolds during the school life of a student, there should be an increasing emphasis on topics of increasing socio-biological complexity, from aspects of personal health to the wider health problems involved in population studies and conservation. In parallel to this there should also be an increasing emphasis on aspects of health care from the simple to the more complex; that is, from home health to community health and so to national health programmes.

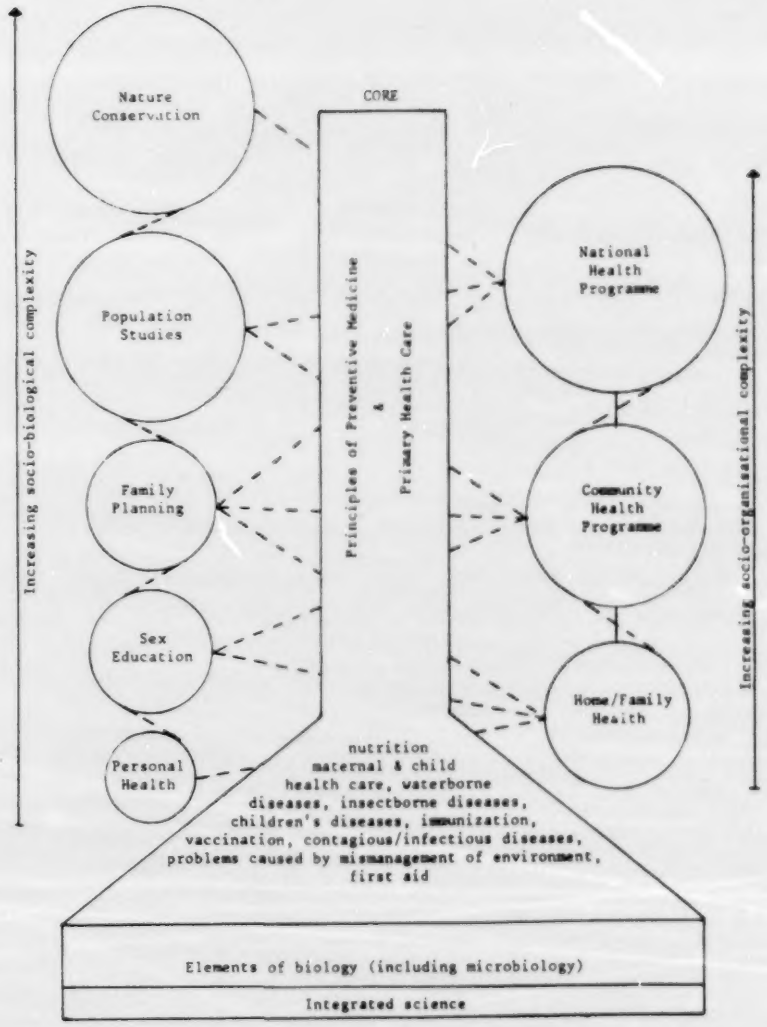

Fig. 14: Proposed Model for Teaching Health Education Through Biology (E. Rugumayo).

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Student-Centred Objectives

A scheme such as the one just outlined only provides a framework for a curriculum. The next step is to determine what specific attributes one would wish students to have acquired at the end of their studies. The following list of objectives has been developed after discussion between the contributors to this book and hence is a consensus of views from several countries:

Develop an ability to discriminate between fact and opinion in information related to health.

Acquire knowledge of body systems and functions with an understanding that growth and development of these systems follow a predictable pattern with many normal variations, producing unique individuals.

Develop an understanding of the relationship between physical and emotional (mental) well-being.

Develop an understanding of the need for proper nutrition.

Develop the skills necessary for physical fitness.

Develop an awareness of the relationship between human beings and the natural and social environments.

Develop a body of knowledge about the causative agents and preventive measures relative to the common communicable diseases in the environment, and develop positive behaviours and attitudes regarding the control of such diseases.

Develop responsible behaviours and attitudes relative to sanitation in the home and community.

Develop an ability to make responsible decisions about alcohol, tobacco and other drugs.

Develop an understanding of the role of being an effective parent and the role of the family in contemporary society.

Develop an ability to make informed decisions concerned with sexuality.

Develop responsible attitudes towards family planning in consonance with a country's population programme.

Acquire knowledge of the range of vocational opportunities in health and allied fields.

Fitting the Teaching of Health Topics into Biology Syllabuses

In the following two tables are listed, in the left-hand column, biological topics to be found in syllabuses of elementary and secondary schools respectively in several countries. Opposite each topic are suggested health topics which can be linked to them, suggested activities through which the topics can be taught and, in the fourth column, the skills and attitudes which would be developed with the activities.

The tables are intended as a resource that teachers can use to plan their own curriculum using the scheme presented in figure 14 and the objectives listed on this page as a guide. It is important that curricula be worked out in detail at the local level. It is only there that final decisions can be made regarding specific topics to be included in teaching. For example, the local foods and their nutritive values, local diseases, local health problems

and health concerns of the youth must be considered in determining the day-to-day learning experiences of the curriculum.

The scheme will help remind teachers to select health topics that relate to major biological themes or concepts in their own syllabus, provide experiences that involve students in their own learning, and attend to the skills and attitudes that can be developed as a result of the knowledge and experiences provided in the curriculum.

TABLE 1

CURRICULUM SCHEME FOR THE ELEMENTARY SCHOOL

Biological Topics	Suggested Health Topics	Suggested Activities	Skills and Activities
Useful plants and animals	Common plants in the local environment that serve as food sources for man/animal, have medicinal value, have nutritional value Useful animals in the local environment that serve as food sources; nutritive value of animal products	Field trip to: market (vegetable, fruit, meat and fish, dairy products sections); orchards, vegetable gardens; medicinal plant gardens Field trip to slaughter house or a report on how animals are prepared for the consumer, the sanitary measures taken Encourage pupils to identify medicinal plants from common vegetation about them. Demonstrate how to prepare and use herbal medicine properly Encourage pupils to have a school medicinal garden	Awareness of the role of traditional (herbal) medicines as part of the overall health delivery system Valuing the need for sanitation regulations in markets, slaughter houses and other places where food is prepared
The sense organs - how we get to know about the world	Care of the senses of sight, hearing and balance, touch, taste Care of the teeth: primary teeth and permanent teeth	Do some simple experiments on: taste (identify parts of the tongue sensitive to sweet, sour, bitter tastes) touch (guessing an object by using only the sense of touch) sight - how much can you see with one eye? Discuss some simple do's and don'ts in regard to maintaining healthy eyes, ears, care of the teeth	Awareness that disabilities in the senses e.g., sight and hearing, can affect learning Valuing the importance of healthy sense organs
The other body systems muscular skeletal digestive circulatory respiratory excretory	Keeping the body systems healthy Importance of nutrition for health	Demonstrate/discuss appropriate health habits (relative to muscles, bones, digestion, circulation, etc.) Discuss common ailments related to the body systems Discuss physical aspects of emotion (organs in the body that respond to fear, sadness, etc.) Identify foods that contribute to the healthy condition of the systems Observe organs, tissues of the different systems in animals (obtained from a meat market) Identify non-conventional food sources available in the community Demonstrate proper ways of preparing and cooking vegetables to retain nutrients	Practice health habits relating to the body systems Develop awareness of the importance of mental, emotional, physical health Develop awareness of the importance of having a balanced diet Develop awareness of existing sources of inexpensive but nutritious foods
Microorganisms, immunology	Common communicable diseases, their prevention Immune systems of the body Guarding against harmful microbes by: a healthy body building up resistance avoiding microbes, or keeping microbes away from the body	Do some experiments to demonstrate presence of microbes on the hands, in the air, water Examine data on spread of common communicable diseases in the country Discuss ways of preventing common communicable diseases Survey the class for leading diseases occuring in their families Discuss body defenses Identify foods that help make the body strong Read about the story of Pasteur Look at the organisms in a drop of pond water	Develop proper attitudes towards prevention of diseases through appropriate health habits Awareness that medicines should be taken with caution or under prescription of the doctor

Biological Topics	Suggested Health Topics	Suggested Activities	Skills and Attitudes
Human activity and life Living things have similar needs in any environment: food, water, shelter, protection against extremes of temperature, etc. There are different kinds of environment each with characteristic features and life Living things and the environment interchange matter and energy; some plants and animals: what they take from the environment and what they give to the environment. Cycles in nature	The home and school environment cleanliness at home and school and their surroundings health habits: a) body parts - hair, skin, teeth, nails, individual or personal hygiene b) clothing c) meal time d) sleep and rest e) food and drink f) exercise and leisure g) sense organs h) safety precautions The social environment: interpersonal relations with family, friends, neighbours The physical environment sanitation at home, in school, in the community providing safe drinking water, sanitary garbage and waste disposal	Role playing on critical incidents involving interpersonal relations Use posters to demonstrate good health habits, personal hygiene Identify the community's needs relative to sources of food and water supply Discuss sanitation principles in the context of the home e.g., garbage and waste disposal, means of sewage disposal; community sanitation Safe water supply in terms of the home and local community. Field trip to water sources Field trip to garbage dump site of the community Identification of cultural components in the community that deal with aesthetic aspects of the environment (paintings, poems) Observation and discussion of behaviours, reactions of young children vs. adolescents to demonstrate growth (social and psychological)	Develop awareness of man's interdependence with his natural and physical environment Develop preference for an environment that is aesthetically pleasing Creation/construction/preservation of objects that enhance a beautiful environment Active involvement in physical fitness programmes offered in the school/community Develop awareness of, and practice of, proper sanitation in the home, school and community
The environment is in constant change. Noting changes in the community (within the child's experience) Man as a major agent of change in the environment	First aid (e.g., poisoning, wounds, animal and insect bites, drowning, fainting, shock, etc.) Growing up mentally, physically, socially Signs of health and illness Sex education and family planning; infant care and nutrition; maternal care Desirable and undesireable changes in the environment from the viewpoint of improved health conditions in the community; sources of pollution of air, water, soil in the community Physical fitness	Brief lectures, discussions on sex education topics as included in the school curriculum. This could link up with the foregoing topic on growth Demonstration of first aid procedures for emergencies of common occurrence in the school/community Describe changes in the community; their impact on health conditions. Use visual aids Initiate a conservation project Discuss with illustrations the benefits of exercise to the human body. Give the rationale from a biological viewpoint of some exercises/games for physical fitness (coordinate with the physical education instructor) Encourage participation in physical fitness programmes	
The commonly used drugs caffeine (coffee, tea, cocoa, cola drinks) nicotine (tobacco) alcohol the most commonly used drugs for this age group in the community	Nutrition and coffee, tea and carbonated drinks Effect of alcoholic beverages on body systems Tobacco and smoking: effect on the respiratory system General and overall effect of abused drugs on the body systems	Examine nutritive value of common drinks Examine advertisements: what effect do they have on the reader?	Develop awareness of the uses of drugs in medication, and their irresponsible use by individuals Develop awareness of the need for caution in the use of abused drugs and drugs sold "over-the-counter"

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TABLE 2

CURRICULUM SCHEME FOR THE SECONDARY SCHOOL

Biological Topics	Suggested Health Topics	Suggested Activities	Skills and Attitudes
Cell structure and functions Molecules of life	Effects of alcohol, drugs, tobacco on cells Possible physical effects of excessive use of alcohol over a long period of time Effects of alcohol abuse and alcoholism on the family, the community, the person's ability to function The role of drugs in the prevention and control of disease and pain Effect of chemical and environmental mutagens on the cell e.g., heavy metals, pesticides and insecticides, radiation and food additives	Have the students observe cells of various types under the microscope, both live and dead cells Collect materials from the Heart Centre, Lung Centre, Drug and Narcotics Division or other similar organisations and make an informative exhibit relative to health concepts studied Have the students identify the organs and systems of the body that are most affected by excessive use of alcohol. Describe how these organs are affected and what it means to the overall health of the individual Have the students bring to class magazine and newspaper advertisements on alcoholic beverages; have them describe TV advertisements too. Have them identify misleading statements/illustrations, and discuss how they think these advertisements would influence young people's attitudes Invite a doctor to speak on medical uses of drugs on: the nervous system, cardiovascular system, gastrointestinal system, the blood, the endocrine system	Develop a positive attitude towards health protection of the individual and family by safeguarding health, by supporting health plans Be aware of the extent of drug dependency in the age group and its effects on the person Be involved in programmes designed to alleviate drug abuse, alcoholism Recognise the importance of drugs in medicine Recognise that there are existing information on recommended limits to the use of food additives, heavy metals, radiation, pesticides and insecticides & develop a sense of responsibility for safeguarding health relative to the application of such information
Life activities of living organisms Body structure and functions of the various systems of the body that maintain life	Common ailments associated with: heart & circulation respiratory system liver & kidney digestive system nervous system excretory system endocrine system Ways of keeping healthy the various body functions that maintain life The effect of proper nutrition on the different organ systems to attain homeostasis Bacterial and viral respiratory diseases and those of congenital origin Coronary heart disease Common accidents involving the musculoskeletal system in this age group (use quantitative data, i.e., accident statistics if possible) Relationship of the skeletal and muscular systems to body movement and posture Coping with stress	Demonstrate exercises that stimulate circulation; good health practices relating to the different systems Demonstrate first aid methods for artificial respiration; wounds involving large blood vessels; food poisoning; other emergencies that commonly occur in the school/community Have the students list "risk" factors in heart disease Have the student interview and report on what a doctor listens to with a stethoscope Invite a doctor to talk about disorders of the mind and the nervous system List the most common respiratory diseases in the school/community; have students collect data on the prevalence of these diseases in the community. Have students collect materials on the causative agents and preventive measures against these diseases Have students examine beef or sheep lungs and trachea at organ and tissue level Discuss effects of smoking on respiratory system Use case histories to have students find clues whether the individual described are at high or low risks of coronary heart disease. Have them discuss what could be done to lower the risk Invite medical doctors to talk on the prevalence of heart disease in the population Have students practice first aid techniques after they have been exposed to various lessons involving first aid. The practice sessions should include decision-making as to what first aid treatment is to be given and in what order Have the students study bone structure and location in the hands and feet; explain the advantage of many bones in the hands and feet; why the feet are not as versatile as the hands Participation in school/community fitness programmes Invite a doctor, school counsellor/psychologist to talk on ways of coping with stress	Develop first aid skills to preserve life/meet emergencies Develop respect for life Develop awareness of effects of taking in spoiled food Recognise the dangers of smoking to health Develop skills in decision-making Realise the importance of caring for the heart and the circulatory system Develop skills in first aid

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Biological Topics	Suggested Health Topics	Suggested Activities	Skills and Attitudes
Classification of living organisms beneficial and harmful organisms: bacteria, viruses, yeasts and moulds, amoeba, worms	Microorganisms and diseases Common communicable diseases in the country, the community Helping the body resist harmful microorganisms What the individual can do to keep the body functioning well Identify the parasites common among children of the community Collect and demonstrate use of medicinal plants as dewormers Life cycles of organisms that are parasitic to man; which stage is most dangerous to its human host	Have students prepare a report on the 10 most common causes of death and morbidity in the community. What type of disease are most of them? (communicable or noncommunicable) Invite doctor/s and a community health worker to talk about specific diseases, common in the community, status of health in the community Discuss preventive measures relative to the most common diseases in the community Have students examine prepared slides of disease-producing bacteria Have the students grow colonies of bacteria, mould, yeasts Study types of parasitic worms; identify diseased meat and fish as possible sources of parasites	Develop a positive attitude towards prevention of diseases as practiced by the individual Develop a sense of responsibility for maintenance of healthy conditions in one's community Develop health habits to keep one's body fit Develop preference for disease prevention and control to treatment or rehabilitation
Living organisms need food food and nutrition digestion of nutrients	Nutrients needed by the body How much energy the body needs Food for energy, growth, regulation of the body's work Proper preparation of food Eating habits Food and dental care Energy from food Food additives and health	Demonstrate proper eating habits; preparing food correctly Check one's diet for nutrient value Relate nutrition to work productivity; undernutrition effects on growth and development (use local data) Show students how to calculate their daily energy expenditure Have them calculate their daily food intake by looking up the number of calories and the quantities of nutrients associated with each food. Have them compare with the daily expenditure intake based on results, they plan what they should do Give reasons for good health practices like making meal times pleasant, relaxing before meals when worried or under a strain, cooking starchy foods thoroughly, etc. Invite a resource person to talk about the world's food supply and demand Calculate how many calories you take in a day; compare with the requirement for your age and weight (use local data). Compare the average intake of the girls vs. the boys in your class Prepare a report on alternate sources of protein than those traditionally used Have the students read various food labels and identify food additives in them including nitrates and nitrites; identify also the nutrients present in the packaged food Have students list all additives found in packaged food labels and identify what these do to the body Have students read labels to ensure value for cost. Show how to calculate how much nutrient the consumer gets per unit of cost (per dollar, peso, pound, etc.) Have the students conduct a survey of food choices in their own class. Have them evaluate these choices from the viewpoint of nutrition	Develop skills in preparing food properly, checking one's own daily food requirements Develop familiarity with local food attitudes and beliefs examining these in the light of health practices and knowledge Develop decision-making skills Develop tolerance towards food preferences of population subgroups Become aware of socio-cultural factors that affect nutrition patterns in a population Become aware of effects of nutrition deficiencies on work efficiency Develop preference for nutritional fact over food fads Develop skills in evaluating facts and information Develop skills in locating reliable information

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Biological Topics	Suggested Health Topics	Suggested Activities	Skills and Activities
Reproduction in man human reproductive system; glands important in reproduction; menstrual cycle Development and growth Family planning Methods of birth control	Hormones in puberty and pregnancy Sex differences and energy needs Sex glands and body development Education for parenthood preconception health and family planning, prenatal, delivery and postnatal maternal health infant and child health child rearing interpersonal relationships home management Prenatal care Care of infants Growing old & degenerative diseases Sexually transmitted diseases	Survey family size in the community Prepare reports on population and resources forecast for the next two decades. Discuss implications Provide facts to replace myths students have about impregnation VD, birth control, homosexuality and other oareas of concern Examine methods of contraception in relation to availability, effectiveness and possible side effects Discuss psychosocial factors in general by having students submit their questions in written form. Resource persons may be invited for questions needing more specialised/complex answers Collect beliefs on prenancy and child care; discuss/clarify implications Invite an appropriate resource person to help clarify issues related to this topic Discuss problems of population control; responsible parenthood	Develop positive attitudes toward: population control infant, child and maternal care Development of desirable sexual attitudes and behaviour including acceptance of heterosexual roles as boys and girls Develop ability to make informed decisions in the area of sexuality
Heredity Genetic engineering	Misconceptions about genetic health Genetic disorders: their causes, transmission in the population; prevention and/or rehabilitation Influence on health of: expanding population, poverty; social implications of these factors	Secure information from the local hospital/s about the most frequently occuring birth defects; what are some of the dominant genetic diseases in the population?	To appreciate the significance of genetic health as an urgent health matter Recognise the role played by both the genes and the environment in shaping the individual
Man and his environment Man's activities and their impact on the environment: waste disposal use of chemicals polluting the air illegal logging noise pollution	Guarding community health public water supply public waste disposal other health services The citizen's role in keeping the home and community sanitary The citizen's role in minimizing pollution of: air water land noise Practices by which man destroys the quality of the environment	Have the students look up community and national health regulations and report on this topic Analyse (make a bacterial count of) the school or community water supply. Have students draw inferences about their observations Get data regarding pollution from the National Pollution Council or similar agency. Discuss implications of the data to the health of the community Observe pollution count index in strategic places. Discuss implications to health and remedial measures that may be undertaken Have the students find out how their community disposes of waste. Let them evaluate it in terms of standards of sanitation Have the students find out whether the river/stream/pond water in the community is polluted; if so how heavily polluted they are, using simple BOD techniques Visit a polluted body of water, identify evidance of hastened eutrophication. Have students discuss possible causes of eutrophication and the implications to water organisms Locate local studies on pollution. Have the students summarise the findings and discuss implications relative to health Have some students report on the use of agricultural pesticides and insecticides, implications to health and pollution, the benefits derived from their use. Have a general discussion on what they would do if they were farmers Perform activities or experiment on waste utilisation or recycling of materials	Develop positive attitudes to community sanitation Develop awareness and commitment towards maintaining the environment as a healthful and aesthetic place for man's habitation

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Biological Topics	Suggested Health Topics	Suggested Activities	Skills and Activities
Medicine, alcohol, drugs and tobacco	Alcohol and health Drug education Smoking and health	Discuss how the excessive amounts of alcohol affects one's ability to function Discuss how the environment can influence a person's decision on the use or nonuse of alcohol Identify the physical, social and emotional risks involved in alcohol abuse Analyse the effect of advertising on a person's decision to drink or not to drink Describe immediate effects of tobacco smoke on the body Evaluate the effects of tobacco advertisement on smoking behaviour Have the students discuss the rights of nonsmokers to unpolluted air Identify various psychological & sociological causes of drug abuse: use case studies from drug rehabilitation centres Invite a doctor, counsellor to talk on the physical, psychological and social effect of drug abuse Describe the role of drugs in the prevention and control of disease and pain. Invite a knowledgeable resource person like a pharmacist or doctor	Be aware of responsible alternative behaviours Develop the ability to make responsible decisions about alcohol, drugs, and tobacco

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Chapter 3

Teaching Methodology

General Considerations

Health education involves linking the objective orientation of science with the subjective perspective of personal decision-making. The topic of nutrition, for example, will involve learning about the constituents of food (carbohydrates, proteins, etc.), the functions of these constituents in the body and other similar knowledge. However, the key issue in terms of the health of a person is whether or not he, or she, will use that knowledge to adopt feeding habits which will enhance their well-being. This will involve decisions to be made which can be influenced as much by, for example, cultural traditions and individual tastes, i.e. matter of opinion, as by scientific knowledge.

> Thus, in teaching health education through biology we must include experiences for students which foster the skills and attitudes required for value-judgement, decision-making and problem-solving.

Health education will also require studies in school to be linked to personal experiences in, and out of, school. The health of students will depend on what they do in their home and community as well as in school. Within the school their classroom studies can be associated with their health behaviour as when bacteria and disease are dealt with as a topic in biology classes and linked to, for example, a school regulation that students should wash their hands before meals. Through visits and project work, for instance, studies in school can be linked to pupils' experiences in their homes and the community health service.

> Health education requires classroom studies in biology to be linked to the personal behaviour of students in, and out of, school.

Experience has shown that neither knowledge alone about health or disease, nor attempts to shock students by providing alarming information about ill-health, are successful in changing individual life-styles in the long-term. Rather, repeated, relatively small experiences which develop healthy habits, like washing hands and brushing teeth routinely, are more likely to have long-term influence. In a school biology course of, say, two lessons per week, there will not be sufficient opportunity to undertake this unless cooperation is achieved with home and community over a long period of time.

> For sound health education, long-term strategies should be developed to encourage positive, healthy behaviour in school, home and community.

Other subjects, e.g. physical education, home economics, social studies, humanities and other sciences, can contribute to health education. Studies in biology need to be linked to those in other subjects a[illegible]isciplinary planning and team-teaching. In each school there should be a coordinator of health education studies who would develop a joint programme with teachers of all subjects contributing to health education and with agencies outside the school. The coordinator may, or may not, be the biology teacher.

> Coordination of teaching is crucial to the success of health education.

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Above all, biology teachers undertaking health education will need to use techniques other than the traditional lecture. They should encourage class discussions; invite specialists from the community to talk to their students; organise visits and encourage students to report on important health matters in their community; give students the opportunity to express their ideas freely but constructively and even to question those of their teachers; provide opportunities for practical work by the students and arrange demonstrations; use a variety of teaching resources and attempt to stimulate the interest of students through using games and simulations and other comparable techniques.

Biology teachers undertaking health education will need to expand their repertoire of teaching techniques.

Teaching Strategies

Dr. G. Rex Meyer, a member of the IUBS Committee for Biological Education has compiled an accout of 'Strategies for Improving the Social Effectiveness of Biological Education at School Level - with special reference to innovative methods of teaching' (Occasional Paper No. 4, Institute for Science and Mathematics Education Development, University of the Philippines, Diliman, Quezon City, Nov. 1983). This is based on his earlier report entitled, 'Alternative strategies including methodologies for learning - teaching of biology at school level for relevance and appropriate skills development for everyday life' (Paris, UNESCO, 1980). We recommend either of these publications to biology teachers about to incorporate health education into their work. They will find there the detailed guidance needed to extend their range of teaching techniques. Here we will be concerned with a few key issues:

Criteria for selecting which teaching methods to use

Here we would follow Meyer's advice. Whatever methods are used, they should

be appropriate for the aims and objectives that they are to achieve,

be appropriate for the subject matter to be covered,

involve learners in active participation,

be likely to promote transfer from school life to more general situations in the society e.g., through some form of work experience,

provide opportunities for learners to try out ideas and procedures in situations free of threat or of significant risk,

promote interpersonal relationships between all members of the school and the community,

be sufficiently varied throughout a course to ensure maximum interest and motivation,

be suitable for the abilities and interests of the learners concerned,

be compatible with the background, qualifications and interests of the teachers concerned,

make optimal use of resources available to the school system concerned - human, space and material,

be appropriate for the assessment procedures to be used,

cater to individuals, small groups and large groups according to need,

involve a variety of input, processing and output techniques,

involve a variety of communication techniques and media,

cater to the various cognitive styles of pupils and teachers, and

encourage team work by staff and pupils.

Teaching for intellectual and cognitive development

The teaching of science lends itself well to the development of intellectual skills. This is just as important for health education. Practical work in the laboratory, questioning techniques, project work, discussions and other techniques can be used to present lessons that will promote the development of skills required for problem-solving. Whilst some of these relate specifically to the methods of science, they have much wider value. The types of skills of value in teaching health education through biology are as follows:

Science process skills: observing, comparing, classifying, quantifying, measuring, inferring, predicting, formulating hypotheses, controlling variables, interpreting data, defining operationally, formulating models, experimenting

General problem-solving skills: recognising existence of a problem, formulation of hypothesis, screening hypothesis (obtaining information/evidence, testing the hypothesis, elimination/modification of wrong hypothesis), making tentative conclusions, checking the tentative conclusion as a fact

Motivating students

Motivation is important for effective learning. To achieve appropriate motivation we suggest that teachers follow the advice of Ramirez and Castaneda (1974) by

encouraging independent student achievement, emphasising the importance of individual effort,

encouraging competition between individual students,

adopting a consultant role and encouraging students to seek help only when they are in difficulty,

encouraging learning through trial and error,

encouraging task-orientation,

expressing confidence in the child's ability to succeed,

giving guidance to students, making clear the purpose of a lesson, delineating the steps towards a solution,

encouraging learning through imitation,

encouraging development of group feeling, encouraging the class to think and work as a unit, and

providing opportunities for students to see how their personal experiences are related to the concept being learned.

Teaching to encourage self-direction in learning

Self-direction in learning is important in health education as it is in any other aspect. It includes independent as well as other types of learning. It implies planning and management of learning by individuals to accomplish their personal, social, and vocational development by recognising specific learning needs and meeting these needs through suitable resources and techniques. Some strategies the teacher may use to help develop self-direction in students are:

use modules/learning units that allow students to study at their own pace,

allow much interlearning (learning from sources other than the classroom, e.g., community/science centres, museums, learning centres, resource persons),

assume the role of facilitator of learning rather than being authoritarian, dogmatic,

involve the student in planning and managing some phases of his learning programme,

encourage the students to be involved in evaluating their work,

allow for alternative approaches in time, place, mode and content of learning, and

provide opportunities whereby students can make their own choices, e.g., by providing them with objectives, giving self-assessment tasks, providing immediate feedback, etc.

Teaching to facilitate reception learning

The strategies in this category relate very much to the ideas of Ausubel on meaningful verbal learning. Ausubel claims that much of learning is really reception learning. Our experience in the local situation supports this statement. Inspite of the enticements to use newer methods which involve student participation (observable to the onlooker), teachers still tend to use expository methods that encourage passive learning. Yet the learning need not be passive, for teaching strategies can be used that make the student participate actively in his own learning. Such involvement could be mental involvement and is not easily observable. In this connection, three categories of teaching behaviours can be identified: (1) skills that promote active reception learning, (2) skills that strengthen cognitive structure, and (3) skills that promote a critical approach to knowledge.

In the first category, the major purpose is to involve the student actively in the process of learning. This is brought about by such means as analysing relationships between new and old knowledge, and relating new materials to his own experience by considering alternative views. Any teaching technique that causes students to get involved in this manner can be used.

The second set of skills is designed to strengthen cognitive structure. This implies manipulating the content and arrangement of learning experience so that subsequent assimilation of concepts is facilitated. An advance organiser (or subsumer) is used; it may be a concept or statement of a relationship. The advance organiser needs itself to be taught to help the learner integrate new concepts with what he already has in his cognitive structure, and to discriminate between old and new concepts and so avoid

confusion. For example, an advance organiser is presented to provide a general idea of a phenomenon to which a subsumer of a more specific nature can be associated. The content of such organisers is selected on the basis of an organiser's appropriateness for explaining, integrating and interrelating the subsequent learning materials. The major purpose of this second set of skills is to help the learner integrate and discriminate new learning from the old.

The third set of skills promotes a critical approach to knowledge. This is intended to encourage students to ask critical questions, to recognise assumptions, to challenge and reconcile them as they seek to clarify the information they receive.

Relating teaching to the community

Biology teachers need lists of resources that can be tapped for relevant teaching materials in biology and in health sciences. They will need to compile their own resource materials by making a survey of the biological/health resources available in the community, by surveying health needs and problems particularly those common in the community, and by consulting knowledgeable health personnel of the local health centre.

Teaching for social relevance

Science-related social issues are generally defined in terms associated with a country's economic and developmental programme and goals. Attempts to prepare socially relevant science education materials which relate the science curriculum to community concerns have led some curriculum workers to develop methods of obtaining data on which community-based learning materials can be developed. Briefly, these strategies include needs and resource assessment, which is conducted through such methods as in-depth interviews, questionnaires, group sessions, and observation. The data thus gathered are analysed to identify problems, and the implications to science teaching and health education are then drawn from them.

Teaching with a focus on values

When the question of values is raised, a science teacher automatically thinks of scientific attitudes, for these are indeed values which lend themselves to development through science lessons. It is suggested that they are also relevant in health education. Three general categories of values which are common to both science and health education will be described (Gauld and Herkins, 1980). One set of attitudes consists of those exhibited towards ideas and information, e.g., curiosity, scepticism, humility, anti-authoritarianism. A second set of attitudes includes the components of critical-mindedness such as objectivity, intellectual honesty, weighing evidence, and suspending judgement. And a third set embodies the commitment to particular scientific beliefs. This category includes, among others, loyalty to truth, belief in the cause and effect relationship, and belief in the understandability of nature.

It is suggested that such values should be encouraged in teaching health education in biology by carefully adapting laboratory work, using investigatory exercises, using biographies of outstanding scientists and health workers, and, above all, by the teachers acting as a model by conforming in what he, or she, does to such values.

Value analysis is a way of teaching about values. The tasks involved are quite similar to the tasks involved in teaching cognitive lessons: identifying and clarifying the value question, assembling the related facts, clarifying the relevance of these facts, arriving at a tentative value decision, and testing the value principle implied in a decision.

Bringing into classroom discussion some science-related health issues is yet another strategy for teaching values. Role-playing may be used in discussing an issue. Another strategy involves decision-making, as when students are asked to make choices regarding a community health problem, to analyse the reasons for their choices and infer possible consequences of such decisions.

Maintaining the Scientific Outlook

Many will agree that the greatest contribution of science education relates to the development of a scientific outlook and the ability to think critically, and that these are necessary for the effective functioning of an individual in the modern world. This aspect of individual development is recognised as a primary objective in both developed and developing countries where science education is expected to fulfill other important, more socially oriented purposes.

In incorporating health education in biology teaching, some biology educators have warned that science teaching must not lose its focus on developing scientific-mindedness in the individual - a very important skill for the day-to-day functioning of an individual in this age of science and technology. As more health education topics find their way into the science curriculum, efforts should be made to keep that approach to science teaching which develops critical-mindedness and exposes students to first hand experiences in the use of science processes and critical thinking skills. These are, after all, basic skills needed for good healthful living, too. Therefore, it will benefit the learner more if health education adopts the same approaches as those employed in science teaching, particularly those that tend to develop the student's intellectual skills. Thus, as a caveat, we recommend that the incorporation of health-related topics should not undermine the main concern of a science teacher which should still be the major objectives of science education expressed in the knowledge, skill and attitudes the students need to acquire.

Annotated Bibliography

The list of references presented here has been compiled from several countries, although it is by no means comprehensive. However, we are certain that amongst this collection are references which will provide valuable guidance to curriculum developers, teacher educators and teachers in the field of biology education who wish to embark on the task of health education.

Archenhold, W. F., Driver, R. H., Orton, A., Wood-Robinson, C. (ed.): Cognitive Development Research in Science and Mathematics. Proc. of an International Seminar. The University of Leeds, U.K., 1979.

Asian Association for Biology Education. Third Asian Regional Conference on School Biology: Proceedings of the Third Biennial Conference. December, 1970.

This volume includes investigatory exercises for the secondary level. Of interest to health are three of the investigations conducted by secondary students and their teachers: one on pollution, a second on the age of menarche and a third on the incidence of myopia among the school population.

Asian Programme of Educational Innovation for Development (APEID). Report of A Regional Workshop: Biology Education in Asia. Hernandez, Dolores F. 'Strategies and Methods for Teaching/ Learning Biology for General Education.' Bangkok, Thailand: UNESCO Regional Office, 1980.

This report contains a lengthy article on strategies for teaching biology, giving an overall review of various methods, old and new.

Batugal, P. A. 'Non-conventional Plant Sources of Food', Nutrition in National Development (A Forum). Proceedings of a Meeting Sponsored by Philippine Association of Nutrition, Los Banos Chapter, Society for the Advancement of Research, Inc., Los Banos, Philippines: January, 1975. Pp. 110-114.

This is a brief report on a programme which as its first phase includes a survey, identification and collection of plants, and as its second phase, the chemical analysis of nutritional values of the plants. Comparisons of the nutritional values of some conventional and non-conventional sources of plant food are made. It lists 63 edible wild plants of Philippine forests.

Bauwens, E. E. The Anthropology of Health. The C. V. Mosby Company, St. Louis, U.S.A., 1978.

Although written for a Western audience in the health profession, teachers of health/biology will find some chapters useful and interesting e.g., the section that deals with nutritional anthropology, the examples given to illustrate an evolutionary process - the interaction of biological and cultural changes. Another section that could prove informative to teachers is the one on anthropological perspectives on ageing and dying.

Bedworth, D. A. and Bedworth, A. E. Health Education: A Process for Human Effectiveness. New York: Harper and Row Publishers, U.S.A., 1978.

This volume is a useful guide for health educators. The contents fall under three categories: philosophical foundations of health education; psychological/sociological perspectives of health education; and the school/community health education programme.

Bustrillos, N. 'Socio-cultural Foundation of Nutrition Education', Nutrition in National Development (A Forum). Pp. 34-39., Philippines.

The major topics discussed in this article are food values, concepts and restrictions, food distribution and the social structure, food messages and approaches. The article contains a fine bibliography of Philippine materials related to this subject.

Butler, N. Learning How Things Happen/Child Development Project

University of Bristol
B. von Leer Foundation, The Hague, Netherlands
20 p. Examples of methodology

In comic book form, this booklet instructs mothers and their families about child growth and development. Many of the lessons show the 'bad' way to raise a child and the 'good' way to raise a child. The lessons are mainly geared toward motor development stimulation and behaviour. There are some cartoons on health, nutrition, breast feeding and immunizations.

Cameron, M. and Hofvander, Y. Manual on Feeding Infants and Young Children - 2nd edition.

Pub.: Protein-Calorie Advisory Group of the United Nations System, United Nations, N.Y. 10017 U.S.A.
184 p. 68 references, glossary, index.

This manual is designed to help those who are involved in the fields of health and nutrition. Its aim is to provide an appropriate, useful, and practical background of knowledge that explains why preventative treatment and improvement in the health and the food of infants, young children, and their mothers is necessary, and how this may be achieved using local resources. Topics covered include:

Growth and development of the young child
Lactation
Weaning
Major causes of disease and death in children under 5 years in developing countries
The nutritional value of food and its use during the first five years
Nutrient contributions of various foods
Food processing and its effect on nutrients
Nutrition education
Measurement of foods
Care of food and utensils
Formular feeding
Supplementary feeding
Planning on infant feeding programme
Using an infant feeding programme
The use of recommended mixes for conventional meals
Outline plan for a local edition

In the appendix is a simple method of calculating the protein value of food.

Canadian Health Education Specialists Society, Annotated Guide to Health Instruction Materials in Canada, C.H.E.S.S., Box 2305, Station D., Ottawa, Ontario, Canada, 1974.

Claudio, V. S., de Leon, S. Y. and Arroyo, P. T. Basic Foods for Filipinos. Manila: Merriam School and Office Supplies Corp. 1977.

This book is on food science in the Philippine context, it discusses the composition and structure of food, their market forms, the processes they undergo in cooking and the supporting principles that govern such processes.

Comité Anti-Bwaki: 9ème Rapport Annuel 1980-1981

Bukavi/Kivu, République du Zaire, 1982, 87 p.

This report reviews the budget and activities of the Comité pour la Lutte contre le Kwashiorkor et la Protection de l'Enfance au Kivu, abbreviated Comité Anti-Bwaki, during 1980 and 1981. The report consists of reports from health and nutrition centres financially supported by the Comité Anti-Bwaki. Health care, food distribution, and nutrition education are the main activities reviewed. Topics of nutrition education lessons are listed and in some centres an evaluation on the nutrition education methodology is included, home visits proving to be the most effective way of communicating nutrition information in the village setting.

Consumer Health: A Selected List of Materials.

An annotated list of recent publications on health topics, written in layman language. Available free of charge from: The President, Health Libraries Association of B.C., c/o B.C. Medical Library Service, 1807 West 10th Avenue, Vancouver, B.C. V6J Canada. Enclose postage paid mailing label.

Cowley, J., David, K. and William, T. (eds.): Health Education in Schools, Harper & Row, London, U.K., 1981.

This book surveys the present position of health education in schools in the U.K. and provides evidence of possible future developments. It is intended as a basic reader for this wide-ranging and diffuse area of education.

Cuadernos Médico-Socioles Alimentación y Nutrición
vcl. XXI, no. 4 Santiago de Chile - Deciembre de 1980

In Spanish only.

Deutsch, R. N., The Family Guide to Better Food and Better Health. Creative Home Library Meredith Company, Des Moines, Iowa, U.S.A., 1971. Soft cover, Bantam Book, 1973.

De Padua, L. S.; Lugod, G. C.; and Pancho, J. V. Handbook on Philippine Medicinal Plants. Los Baños, Laguna: Documentation and Information Section, Office of the Director of Research, University of the Philippines at Los Baños, 1977-78.

This is a good sourcebook for teachers who would like to introduce knowledge about medicinal plants in a locality. Instructions on how the plants can be used are provided.

Elias, M. F. et. al. Basic Processes in Adult Developmental Psychology. The C. V. Mosby Company, St. Louis, U.S.A., 1977.

The biology teacher educator will find some chapters here of particular interest and usefulness in understanding some aspects of the biological roots of behaviour, particularly the chapters dealing with hormones, health and behaviour, and genotype-environment.

Fidanza, F. et. al.,
'Nutrition Education and Training for Health Science Professionals' in World Review of Nutrition and Dietics, vol. 38, Physiology and Social Nutrition and Nutritional Education. Bourne, C. H. ed., Kager, Basel, Switzerland, 1981. p. 153-227.

This is a series of papers on nutrition education and training for health science professionals. The papers cover the need for nutrition education for nurses, doctors, health workers, pharmacologists, dentists and nutrition workers working in both developing and industrialised countries. The concluding suggestions call for an increased awareness by the medical professionals of the important nutritional impacts on health. This requires that nutrition education and training be integrated into all health profession curricula.

Gallender, D.:
Teaching Eating and Toileting Skills to the Multi-Handicapped in the School Setting.

Illinois, Charles C. Thomas, Publisher, 1980, U.S.A.
355 p., 270 ref., index

The challenge confronting public education in the United States is to design meaningful and effective programmes for all handicapped children who now have the right to attend public school under Public Law 94-142 passed in 1980. The book covers the processes of eating and toileting, and then provides instructional material explaining to the teacher some methods of teaching these skills. Techniques and games are briefly but clearly described.

Gauld, C. F. and Herkins A. A. 'Scientific Attitudes: A Review', Studies in Science Education 7 (1980): 129-161, U.K.

Gesundheitserziehung von A - Z. (Handbook in separate sheet form, 1976 - 1979.) Bundesvereinigung für Gesundheitserziehung. Simrockallee 12, 5300 Bonn 2 (Bad Godesberg), F. R. Germany, Tel.: 02221 - 353917.

Griffin, G. A. and Light, L.:
Nutrition Education: Curricular Relevance Design and the Problem of Change.

UNESCO Educational Studies and Documents No. 18.
The UNESCO Press, 7, Place de Fontenoy, 75700 Paris, 1975
55 p.

This publication is part of the UNESCO programme to promote and improve the quality of nutrition education as one of several interventions for alternating food and nutrition problems throughout the world. Specifically, it takes up the question of curriculum development in nutrition education, the focal point being to make such curricula relevant to

students' needs and immediate local conditions. It stresses the necessity for involving various departments and interests and for building community support to reinforce student learning. It calls for education institutions to re-examine their social mission and their functional capacity to help, preserve or change a given nutritional situation.

The study is designed for professional nutrition educators and educational personnel responsible for the planning and implementation of nutrition education programmes. The five chapters cover:

National development, nutrition and the role of education
Proofs of nutritional behaviour and programme planning
Curriculum design and the planning process
Educational change: problems and prospects
Community and educational support for school nutrition programmes

Hambraeus, L. ed.:
Nutrition in Europe: Proceedings of the Third European Nutrition Conference, Uppsala, Sweden

Almqvist & Wiksell, 1980
150 p.

The Third European Nutrition Conference, held in Uppsala, Sweden from June 19-21, 1980, dealt with three main topics during the plenary sessions: How Europe can contribute to nutrition research for developing countries; food and nutrition policy and planning: a field for collaborative research in agriculture and nutrition; and nutrition education of the public.

Six papers presented discuss various aspects of nutrition education from school health education to mass media approaches and the influence of a national nutrition society. Abstracts are provided at the beginning of each paper.

Short summaries of other papers and communications presented during the conference are published at the back of the proceedings. Some that are relevant to nutrition education include: nutrition of the public through secondary schools; education in the rehabilitation centre - the tea party approach; public information on nutrition in France; public education for health-nutritional aspects of a national campaign; a study on the need for nutrition education at the health care centre of Helsinki City.

Health Education Council Project: Living Well
Cambridge University Press, U.K., 1977

Directed by Peter McPhail, this project provided excellent discussion and teaching material on personal relationships and health topics.

Hubler-Ross, E., On Death and Dying,
Macmillan, U.S.A., 1969.

Imahori, Kozo, Baydoun, E. and Hernandez, D. The Teaching of Health Through Biology Education in Three Countries. A preliminary and partial report to CBE-IUBS. Quezon City: University of the Philippines, Science Education Centre, June, 1983.

The countries represented in this report are: Japan, Jordan and the Philippines.

The Institute for the Promotion of Teaching Science and Technology of Thailand:
Nutrition Education for School Children and Parents

19 p.

An example of curriculum development of integrated science for grades 7 - 9 in Thailand. Several graphs and four diagrams.

Intengan, C. L. 'Food and Nutrition Problems in the Philippines', Nutrition in National Development (A Forum). Pp. 9-13.

A nationwide survey of nutrition which indicates the nutritional situation of the country is discussed: the height and weight measurement of the population; energy, protein, Vitamin A in the Filipino diet; endemic goitre and food distribution (in terms of calorie requirements).

Jenne, F. H. and Greene, W. H. Turner's School Health and Health Education. The C. V. Mosby Company, St. Louis, U.S.A., 1976.

This is a book for school health personnel in American schools. However, the general principles underlying school health education and services are applicable in a wide variety of situations. The biology teacher will find the sections on healthful social, emotional and physical environments, health promotions and health problems particularly helpful as sources of topics which can be related to the teaching of biology.

Jesuitas, P. P. et. al. A Survey of Questions Filipino Children Often Ask About Themselves and Their Environment. Monograph No. 21. Diliman, Quezon City: Science Education Centre, University of the Philippines, December, 1981.

Over 2000 students were included in this survey which yielded over 40,000 questions. The questions were analysed to determine the types of questions according to subject matter and type of questions. The most frequently asked questions were also noted.

Karplus, R. Teaching for the Development of Reasoning. Group in Science and Mathematics Education and Lawrence Hall of Science, University of California, Berkely, CA, U.S.A., September, 1978.

This group has produced several workshop materials on the development of reasoning for use by teachers in different subject areas, e.g., biology, chemistry, physics.

King, M. H., King, F. M., Mortry, D. C., Burgess, H. S. L., Burgess, A. P.:
Nutrition for Developing Countries

English Language Book Society and Oxford University Press, 1980
approx. 230 p.
Order from TALL, 30 Guildford St., London WC 1

This book covers most of the content of a nutrition course suitable for health workers, community development workers, agricultural assistants, midwives, and school teachers. It can also be used as a 'teach yourself' text. It may require modification for teaching in schools, and only some of the material is suitable for primary schools.

Practical work is suggested in 'things to do' at the end of each chapter. One of the best ways of organising practical work is to do it in the form of projects, pairs of students choosing different 'things to do' and presenting their results to the assembled class.

The text is written in simple vocabulary with good instructions and illustrations.

Kuristel, F.:
'Assessing Community Needs: Implications for Curriculum and Staff Development in Health Education'

The Journal of School Health, April, 1978, p. 220-224
5 p., xerox

This article discusses the importance of assessing each community's needs before designing a health education programme for the schools involved. Assessing a community's needs helps to establish goals and objectives suitable to the local situation; develop programme rationales for teachers, parents, and students; identify variations in how the curriculum must be implemented in order to respond best to community needs. Several needs assessment strategies are briefly outlined.

Lappe, F. M., Diet for a Small Planet
(alternative protein sources), Ballantine Books, U.S.A., 1975.

Lebanese School Textbook for Health Education, 1974
UNESCO EO/STE Documentation Centre

Text in English, some Arabic, 70 p.

This textbook, aimed at classes in the intermediate school, emphasises that health is dependent on making good choices. It provides the necessary information to enable the student to elect, in full consciousness of the relevant facts, what is good or harmful to his/her health status.

Topics covered include: growth and development, community health, the environment, pollution and health, safety, first aid, food and nutrition, hygiene and personal health, diseases and germs, tobacco and drugs, family life, and emotional health. Pictures and diagrams illustrate the text.

A unique feature of this textbook is a letter at the front of the book inviting parents to participate in forming a curriculum culture in health education.

Leukel, F. Essentials of Physiological Psychology. The C. V. Mosby Company, St. Louis, U.S.A., 1978.

The biology teacher will find this a very useful reference book on physiology of the senses, consciousness, motivation, emotion, learning, stress, endocrine glands. It is simply written and very readable.

Lowenberg, M. et al, Food and Man, John Wiley and Sons Ltd., New York, NY, U.S.A., 1968.

Martin, E. Nutrition in Action, Holt Rinehart Winston of Canada Ltd., Toronto, Ontario, Canada, 1973.

Medien-Katalog zur Gesundheitserziehung. (Collection of separate sheets, structured by different colours into categories: Notices, Brochures and Booklets, Slides, Records and Cassettes, including all details about editor, contents, format, addresses, source, and price. Very recommendable, 1979) Bundesvereinigung für Gesundheitserziehung. Simrockallee 12, 5300 Bonn 2 (Bad Godesberg), F. R. Germany, Tel.: 02221 - 353917.

Medien zur Gesundheitserziehung. (Review and criticism, collected by a symposium 1976 at Goslar, containing a list of unconventional media as well as recommendations on films and a very detailed list of addresses). Bundesvereinigung für Gesundheitserziehung. Simrockallee 12, 5300 Bonn 2 (Bad Godesberg), F. R. Germany, Tel.: 02221 - 353917.

Meyer, G. R. Strategies for Improving the Social Effectiveness of Biological Education at School Level - with special reference to innovative methods of teaching. A paper presented at the CBE-IUBS meeting in Jordan, August, 1983. Published by the Institute for Science and Mathematics Education Development, University of the Philippines, Quezon City, November, 1983.

This report includes a list of strategies and examples of how they may be applied in the classroom to make biology teaching more socially relevant.

Ministère de la Santé, Ministère de l'Education:
La prévention des diarrhées l'alimentation du nourisson

L'education santé intégrée à l'enseignement fondamental
Alger, 1962
French version 68 p. - Arabic version 67 p.

Written in French and Arabic, this book is divided into three parts aimed at students in the 5, 6, 7th and above years of schooling.

The first part is for students in grades 5 - 7 and covers the simple treatment of diarrhoea through lectures in science and maths.

The second part covers the information in more detail. Contamination of water is studied and the preventative measures possible are then considered including breast feeding, nutrition and hygiene.

The third part offers practical exercises.

Illustrations and cartoons are helpful.

Mitchell, Rynbergen, Anderson and Dibble, eds.,
Cooper's Nutrition in Health and Disease, 15th edition,
J. B. Lippincott Co., Toronto, Ontario, Canada, 1968.

Moran, J.: Mind Out
Edward Arnold, U.K.

Plays and pages of facts on problems of alcohol, smoking, gambling, drugs, crime and sex.

Nicholson, R.: Open to Question
Edward Arnold, U.K.

A series of discussion starting points for pupils aged 14-18. The approach is open-ended and the material is in the form of newspaper articles, interviews, advertisements and photographs.

Novak, J. D. A Theory of Education. New York: Cornell University Press, U.S.A., 1977.

_____. 'Applying Learning Psychology and the Philosophy of Science to Biology Teaching.' The American Biology Teacher 43 (March, 1978): 148-149, U.S.A.

_____. 'Learning Theory Applied to the Biology Classroom.' The American Biology Teacher 42 (May, 1980): 280-285, U.S.A.

Novak explicates the learning theory developed by Ausubel with much clarity and with several concrete illustrations in the above selections.

Novak, J. D., Helm, H. (ed.), Misconceptions in Science and Mathematics. Proc. International Seminar. Cornell University, Ithaca, New York, U.S.A., 1983.

Nuffield Home Economics: Teachers' Guide to the Basic Course

Pub. by Hutchinson Education, London, U.K.

Nutr. Section: 103 p.

This is a teachers' guide to another book covering food sciences, nutrition, fibres fabrics, and people and homes, designed for 14 - 16 yr. old students primarily in developed countries; the section on nutrition does offer some interesting approaches to integrating nutrition education into the general curriculum.

Packard, V., Processed Foods and the Consumer,
University of Minnesota Press, U.S.A., 1975.

Parkinson, S., Lambert, J.:
The New South Pacific Handbook of Nutrition

Fiji National Food and Nutrition Committee
P.O. Box 2351, Government Buildings, Suva, Fiji 1962
92 p.

This handbook is a practical reference for anyone trying to teach good nutritional habits. Though especially designed for the South Pacific region, the topics cover simple basic nutrition ideas univeral throughout the world. The text and illustrations are straight-forward and clear. The six chapters cover the food groups, nutrition-related diseases,

and the choice and use of foods. The appendix includes a reading list and an easy to read food value chart.

The handbook is a good reference for nutrition educators and a good model for creating a nutrition handbook for other regions.

Pharaon, H., Shammout, H., Hijazi, S.:
'Nutrition Survey on Refugees and Displaced Persons in Jordan'

Jordan Medical Journal May 1970, vol 5, No. 1, p. 39-55
17 p.

This article is a review of the results of a nutrition survey on refugees and displaced persons in two refugee camps in Jordan after the 1967 Middle East War. The survey covered 3004 individuals living in the camp, however this article is confined to the findings in infants and children up to the age of 15 years. Eight tables and 2 charts present the results of the nutrition survey, along with brief clinical findings lists.

A summary and recommendations section includes a listing of most common deficiencies and illnesses found. Though the survey is old, the problems found in 1970 probably still are prevalent in the refugee camps in Jordan. The survey results should be useful in guiding current topics covered in nutrition and health education.

Porter, S.: Problem Page
Edward Arnold, U.K.

Resource material in areas of ethics and human relationships, covering problems at school, at home and with the opposite sex.

Prudhan, S. N., and Dutta, S. N. Drug Abuse: Clinical and Basic Aspects. St. Louis, U.S.A., 1977

This book is intended for use by the medical community. However, it provides valuable information on drugs of abuse and drug abuse useful for others interested in health education. The biology/health teacher may also find the chapters on socio-legal-educational aspects useful.

Quisumbing, E. C. 'Protein from Plant Sources', Nutrition in National Development (A Forum). Pp. 167-170.

This article provides information on the following: protein efficiency ratio, biological value, true digestability, etc. of some food formulations; the protein content of some plant materials; and it lists protein content of 53 indigenous plant sources.

Ramirez, M. and Castaneda, A. Cultural Democracy, Bicognitive Development, and Education.

Academic Press, New York, U.S.A., 1974.

Ramos, A. C. 'Food Attitudes and Beliefs Among Selected Families in Barrio Ususan, Taguig Rizal.' Philippine Journal of Nutrition 30 (January - March, 1977): 29-36, 42.

This report adds to the data on Philippine food lore. Personal interviews were conducted using an open-ended questionnaire. The responses were grouped in two categories: a) general attitude toward food, and b) cognitive qualities of food.

Read, D. A.; Sidney, B.; and Goodman, J. B. Health Education: A Search for Values, Englewood Cliffs, New Jersey: Prentice-Hall, U.S.A., 1977.

A good sourcebook for those interested in the affective domain as this relates to health education.

Redinger, R. F. Jr. 'Biology and Nutrition', Nutrition in National Development (A Forum). Pp. 171-175.

A biologist's view of nutrition is explained: phylogenetic classification is viewed on the basis of nutritional modes; some ecological relationships useful to nutritionists are discussed. Instead of the nutritionists' major concern with cellular and organismic biosystems and with food production, packaging and distributions, the author argues for a holistic viewpoint that places man in the ecosystem and tries to see how nutrition can best be recycled to all organisms so the entire system remains balanced.

Republic of Philippines, Ministry of Health, Regional Health Office No. 8. Annual Report '78. Tacloban City, 1978.

A report on the health situation in the Leyte-Samar Region. Contains data on health statistics such as morbidity and mortality rates.

Republic of Philippines, Ministry of Health, Disease Intelligence Centre. Philippine Health Statistics, 1978.

This contains national statistical data on health over several years, generally, at 5-year intervals; it is a good source of comparative data over given periods of time.

Ritchie, J. D. S.
Learning Better Nutrition.

A second study of approaches and techniques.
FAO, Rome, Italy, 1979
264 p.

This book examines the techniques used in programmes of education and training in nutrition within the context of social, economic and technical change. It also deals with the need for such education, the background information on which the education should be based, its planning, support and evaluation, and the educational channels and methods which seem to show greatest promise.

Robertson, E. C. The Right Combination.
Gage Educational Publishing Ltd., Toronto, Ontario, Canada, 1975.

Ross, J. A., and Maynes, F. J. Teaching Problem-Solving. Toronto, Ontario: The Ontario Institute for Studies in Education, Canada, 1982.

This book is rich in sample lessons for teaching problem skills, e.g., those involving comparative problems, decision making problems, correlational problems and experimental problems. It also includes a chapter on testing.

Rugumayo, E. B. Health Education Through Biology. A paper presented at the IUBS-CBE meeting at Vancouver, B.C., Canada. August 15-21, 1983.

Saint M'Leux, M. Santé Rurale en Afrique Noire: Une expérience dans un centre médical au Gabon,

Thèse pour le doctorat en médicine.
Faculté de Médicine St. Antoine, Paris, France, 1982.
101 p.

This thesis outlines the medical situation in rural Gabon. Chapter V reviews the incidence of malnutrition in infants and the need and importance of nutrition education. The conclusion states that in the majority of cases of malnutrition in the region, the cause is due to lack of knowledge and a poor utilisation of local resources. The author states that the most effective preventative measure against malnutrition is to develop effective nutrition education programmes for the Maternal and Child Health Care Centres. To integrate nutrition education into these centres, support must come from the government.

Santos-Ocampo, P. D. 'The Influence of Undernutrition on Growth and Development', Nutrition in National Development (A Forum). Pp. 19-26.

The effects of malnutrition are discussed in relation to: growth and development at the earliest stages (prenatal), physical growth, enzyme and hormonal activity, the liver and other organs, the central nervous system, the intelligence quotient, behaviour, infections. Local studies are cited.

Save the Children: Bridging the Gap: A Participatory Approach to Health and Nutrition Education.

Pub: Save the Children, 54 Wilton Road, Westport, Connecticut, 06880, U.S.A.
103 p.

Bridging the Gap is a manual designed for nutrition and health educators. Its approach involves participatory training activities aimed at community level workers. The techniques and materials described in the manual are all 'experential', and have been field-tested in several different countries. The techniques are categorised under the four sections of the manual:

Training Community Health and Nutrition Workers
Helping Communities Uncover Health and Nutrition Problems
Creating Learning Activities
Planning and Evaluation with the Community

Each technique is described by setting, time, purpose, preparation, procedure, other uses, with an example following.

Schaefer, G., 'Concept formation in biology: The Concept "Growth"'. European Journal of Science Education, No. 1, pp. 87 - 102, 1979.

Schaefer, G., 'The Concepts of "Health" and "Environment" in Future Biology Teaching.' Proc. 8th Biennial Conf. AABE, Osaka, Japan. Pp. 259-276, 1980.

Schools Council Health Education Project 5 - 13
Nelson, U.K., 1977

This is based on a very wide interpretation of health, encompassing not only hygiene and physical health and development, but also many emotional, social and environmental facts of human life.

The project provides excellent and strongly recommended material in three parts:

All About Me for ages 5 - 8, a teachers' guide.
Think Well for ages 9 - 13, a set of eight teachers' guides.
Pupils' materials.

Schools Council/Health Education Council Health Education 13 - 18 Project: Developing Health Education: A Coordinators' Guide. Forbe Publications, London, U.K., 1984.

This project has produced aids for in-service education of teachers in health education in schools for the age group 13 - 18 and is also concerned with developing curriculum materials for this age group.

Scotney, N.:
Health Education: A Manual for Medical Assistants and Other Rural Health Workers

African Medical and Research Foundation, P.O. Box 30125, Nairobi, Kenya

The Health Education Manual is a practical aid to health staff in their daily activities. It is designed for health education in the health centre and addresses specific problems and situations common to health centres. The content is a theoretical approach and effective communication. Several chapters relate to school health education. This manual is a valuable resource for health workers in Africa.

Sebrell, H. and Haggerty, J. et al, Food and Nutrition, Life Science Library, Time Inc., New York, NY, U.S.A., 1967.

Smith, M. and Pasternak, C., Breaking the Mould.

A teacher reference to facilitate understanding of sex roles. Available from: Ontario Institute for Studies in Education, Toronto, Ontario, Canada, 1977.

Southworth, W. H.:
Curriculum Planning and Some Current Health Problems

UNESCO Educational Studies and Documents No. 13
36 p.

The present publication may be regarded as a supplement to the UNESCO Source Book Planning for Health Education in Schools (by C. B. Turner). Like its predecessor, it is intended for those directly concerned with curriculum planning in relation to health-school administrators, health education supervisors, curriculum specialists, individual teachers - but it is also felt that in its review of education on problems of population, pollution, accident prevention, drugs, venereal diseases and mental health it will be of interest to a broader public.

Although it does not attempt a complete description of each problem, it provides factual data and suggests directions which curriculum planning might take, laying particular stress on cooperation between schools and public health authorities. It is not intended as a teachers' guide, but rather as a collection of ideas which may be useful in developing teachers' guides and curricula adapted to particular situations in individual countries or regions.

Toronto Nutrition Committee, Food Customs of New Canadians, T.N.S., Box 744, Terminal A, Toronto, Ontario, Canada, 1975.

USAID:
Project Description

Available through ICC/Paris or USAID/Washington, Clearinghouse in Development Communication

The packet of project summaries is divided into various categories. Those applicable to health/nutrition education are: nutrition, health, population and education, and human resources.

Each project is summarised briefly with a listing of the target audience, the objective of the project, the media to be used, the donor/sponsor, the duration of the project, and whom to contact for further information. A more detailed description of the project follows, with results and those things of particular interest.

References are given.

Valera, J. B. 'Foods and Attitudes: Towards a Framework for Research in Social Psychology of Nutrition', Nutrition in National Development (A Forum). Pp. 178-182.

This article deals with the behavioural aspects of feeding, the behavioural system of the feeding pattern, and suggests problems for research.

Wells, H. and Canfield, J. 100 Ways to Enhance Self Concept in the Classroom, Prentice-Hall, U.S.A., 1976.

WHO:
Calls for Innovative Techniques in Health Education

Conference on the Child and Adolescent in Society, 1 p.

A summary of the Conference on the Child and Adolescent in Society, convened by the Regional Office for Europe of the World Health Organisation, 26-30 September, 1978. The innovations needed for health education should aim to improve the abilities of the child to use his own resources for his own health care and to teach the concept of community health.

WHO, 1980:
The Primary Health Worker: Working Guide, Guidelines for Training, Guidelines for Adaptation.

346 p.

This working guide outlines the structure and content of training for the primary health worker on the basis of the most common health problems of communities in developing countries.

Part I can be used by the primary health worker as a learning text and also as a guide in his work. Part II is addressed to the health workers' teachers, tutors, and supervisors. Part III discusses the adaptation of this book to local conditions.

Illustrations in Part I are good and help clarify the instructions and messages.

Williams, S. R., Nutrition and Diet Therapy, 2nd Edition, C. V. Mosby Company, Canada Ltd., Toronto, Ontario, Canada, 1973.

Wone, I., Lauture, H. de, Penot, C., Perier-Scheer, M., Cohen, M.:
Première évaluation d'une action d'éducation nutritionnelle dans la médina de Dakar.

Dakar Médical Dakar Société Médicale d'Afrique Occidentale Francaise, vol. XXVI, No. 4, 4eme Trimestre 1981, p. 420-426 (Summary published in English and French).

In March of 1978, a nutrition clinic was begun in the Medina district of Dakar, Senegal. The clinic offered a nutrition education programme to 77 mothers whose children were identified as suffering from first degree malnutrition. This report describes an initial survey of the participating mothers, the survey findings that indicated that malnutrition was related more to socio-cultural reasons than socio-economic conditions, and the ensuing nutrition education programme and its evaluation. The evaluation involved only re-questioning the mothers on pre-nutrition education survey questions. Though the percentage of correct answers increased after the nutrition education was completed, the authors suggest that an investigation into the behaviour of the mothers should be done before an accurate evaluation can be made of the nutrition education programme.

Wood, C. H., Vaugnan, J. P., Glanville, H. de:
Community Health

African Medical and Research Foundation
P.O. Box 30125, Nairobi, Kenya

This book attempts to cover various aspects of community health in a clear way for the training of community health care workers. Community health is discussed in relation to the needs of the people of Tanzania; however, many chapters are general enough to be used as a resource for teacher training in other countries. In particular the pattern of health and disease, community health techniques, immunisation, and control of communicable diseases are well presented. Chapter 8 in the appendix describes how to make a pit latrine.